

Chapter 1

Introduction

This survey of the state of the art on research in early algebra traces the evolution of a relatively new field of research and teaching practice. With its focus on the younger student, aged from about 6 years up to 12 years, this document reveals the nature of the research that has been carried out in early algebra and how it has shaped the growth of the field. The survey attempts to tease out of this evolving and steadily growing research base both the nature of algebraic thinking and the ways in which this thinking can be developed in the primary (elementary) and early middle school student. Mathematical relations, patterns, and arithmetical structures lie at the heart of early algebraic activity, with processes such as noticing, conjecturing, generalizing, representing, justifying, and communicating being central to students' engagement. The role of natural language in the development of early algebraic thinking is considered fundamental. Examples drawn from some of the research in the learning and teaching of early algebra are presented, along with findings from recent neurocognitive studies that offer insights into algebraic thinking and its related activity. This topical survey of the developing field of research study and teaching practice in early algebra should be of interest both to the newcomers to the field, as well as to the more experienced.

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